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EXKOP®MINI
+ QV II Quench Valve

Explosion Isolation System

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Annex:

Log Book (copying collecting main)
QV II Quench Valve Drawing-No.: 11-03-97

EXKOP®MINI Safety Controller
wiring diagram: Drawing-No.: 11-03-98
Drawing-No.: 10-02-39
Drawing-No.: 10-03-69
Drawing-No.: 10-12-54

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1. Operating and safety instructions

This manual must be read carefully and all instructions must be followed before starting the EXKOP®MINI safety system.

Careless installation or any modification of EXKOP®MINI safety system components can result in failure of the entire system. This can result in explosion propagation which can cause the destruction of equipment. The devastating effects of such an explosion can also endanger human life.

The operating diary, which contains the log of all events that have occurred as well as the access code for the **EXKOP®MINI Safety Controller** must be secured by the designated plant safety representative.

The monthly test function (see section 6) must be carried out by the designated plant safety representative and documented in the operating diary.

1.1 Safety instructions

The pressurization of the air tank of an uninstalled **QV II Quench Valve is forbidden** because accidental activation of the **QV II Quench Valve** could lead to injuries resulting from the pinch valve closing area.

Before opening the **EXKOP®MINI Safety Controller** housing, make sure that the power is switched off. **Note:** Disconnecting the power system results in **an activation of the QV II Quench Valve!**

Electrical system work must be performed by a qualified person.

The re-setting of the EXKOP® system after activation must be carried out very carefully to avoid the danger of secondary explosions.

If the explosion protection system includes explosion panels, make sure that personnel are outside of the venting area of the explosion panels!

1.2 Application limitation

The **EXKOP®MINI** explosion isolation system is conceived and certificated in accordance with the following application limitations:

Dust:	all organic and chemical dusts	
	K_{st-max}-Value:	< = 200 bar x m / s
	P_{max}:	< = 10 bar
Pressure:	maximum reduced explosion pressure < =1.0 bar	

Minimum
Ignition Energy (MIE): >3mJ

2. Description

2.1 General

Despite the high safety standards of modern manufacturing facilities, the risk of a dust explosion still continues to be underestimated. In addition, modern production methods have considerably increased the proportion of fine dusts and the risk of an explosion.

Explosion pressure and flames should be vented to the outside where possible. This is not always possible inside buildings, and can only be accomplished with considerable physical modification and large expenditure.

The **REMBE® Q-Rohr®-3 and Q-Box II indoor/outdoor** venting devices offer a safe indoor venting solution.

The **EXKOP®MINI** explosion isolation system together with explosion venting offers effective protection for plant components connected by product or aspiration pipes, where a risk of explosion propagation exists.

The **Q-Rohr®/Q-Box** explosion venting devices or **REMBE® explosion venting panels** vent immediately in the event of an explosion and activate the **EXKOP®MINI Safety Controller**. The signal will be identified by an integrated **KFD2-ST2-Ex1.LB** transformer isolated barrier and triggers the **EXKOP®MINI Safety Controller**. Alternatively, if a spark detector is used, the signal will be identified by an integrated AGF-1012-transformer.

The **EXKOP® Safety Controller** transmits a closing signal to the **QV II Quench Valve**. The Quench Valve isolates the pipe from the oncoming pressure wave and flame by means of pneumatic actuation, via rapid-acting solenoid valves operating within a few milliseconds, thus preventing the explosion from propagating to other parts of the plant.

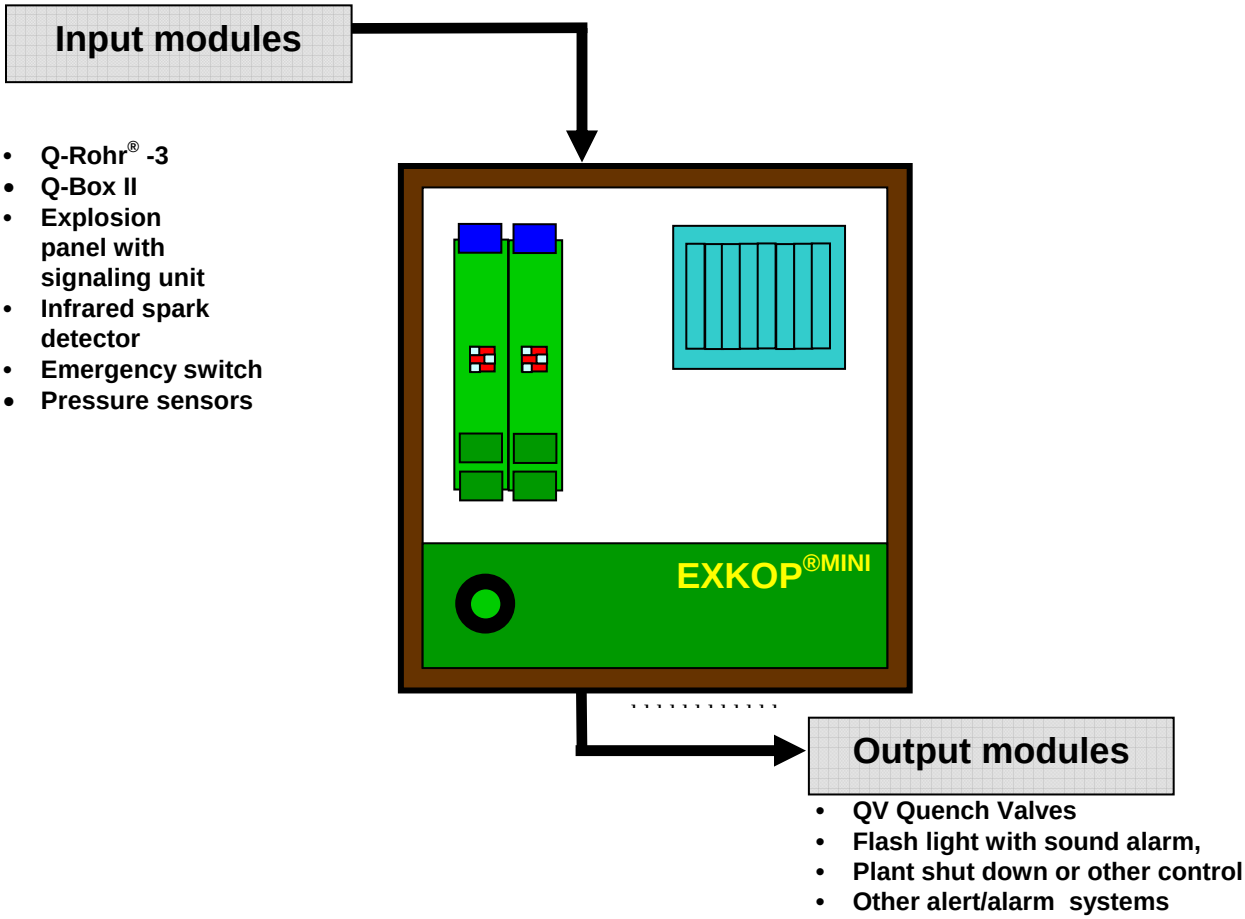
2.2 Scope of EXKOP®MINI System

The **EXKOP®MINI System** normally consists of the following components:

- Explosion venting by **Q-Rohr®-3, Q-Box II** or **REMBE® explosion panels** with their own signaling units.
-
- **EXKOP®MINI Safety Controller** with dynamic self monitoring function and internal data memory as well as an alarm-control and integrated **KFD2-ST2-Ex1.LB transformer isolated barrier/safety barrier.**

- Spark detectors or pressure sensors

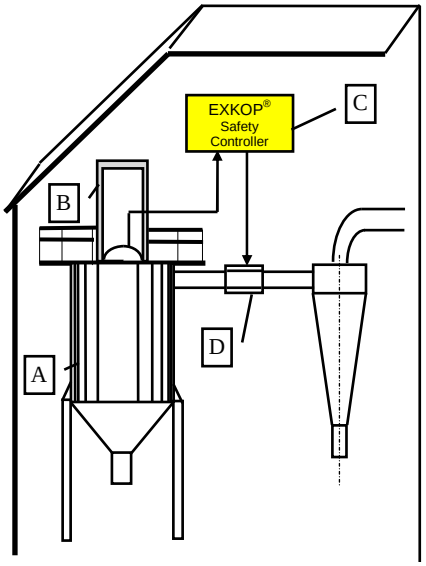
- **QV II Quench Valve** with high speed solenoid valves and integrated air tank



2.3 Function

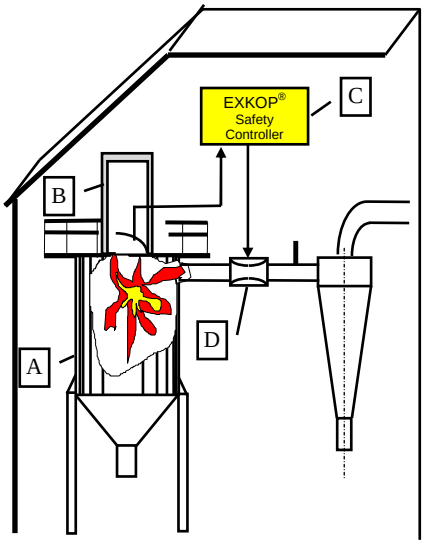
Normal production sequence
The **QV II Quench Valve** (D) is open to full pipe diameter with no pressure drop across the valve.

QV II Quench Valve, REMBE® explosion panels, Q-Rohr®-3 or Q-Box II (B) ensure protection in the event of a dust explosion without interrupting any production sequence.



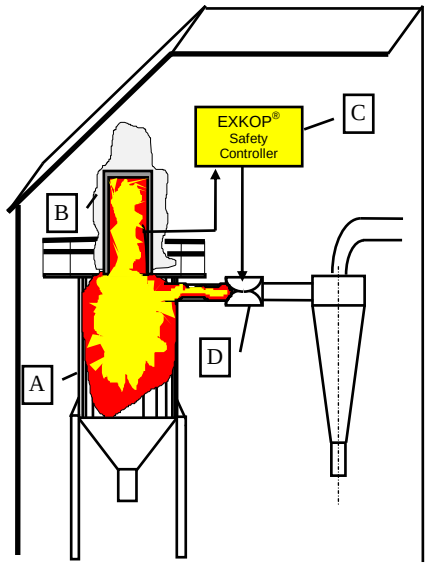
During explosion
Vessel (A) is vented via the explosion venting action of a **REMBE® explosion panel, Q-Rohr®-3 or Q-Box II** (B) indoor/outdoor venting system. Thus, the majority of the pressure wave and flame front developed during the explosion is reduced.

The **Q-Rohr®-3 or Q-Box II** explosion venting system (B) or the **REMBE® explosion panels** within the plant system immediately send a signal to the **EXKOP®MINI Safety Controller** (C) which immediately initiates closure of the **QV II Quench Valve** (D).



During closure, a build-up of product occurs in front of the **QV II Quench Valve** (D). This causes a displacement of oxygen, so that the dust-air concentration is moved out of the explosive range and ignition capability is reduced.

The explosion is completely isolated by the closure of the **QV II Quench Valve**.



3. The QV II Quench Valve

Note: It is important that all information contained in this manual be precisely followed in order to ensure proper valve functioning.

3.1 Installation notes

The **QV II Quench Valve** must be installed in the connecting pipes between the vessels to be isolated. The distances shown below must be precisely observed.

The minimum distance is necessary to ensure proper isolation in the event of an explosion, but the maximum distance must not be exceeded. Otherwise, a second explosion could be initiated in the pipe.

Nominal diameter Quench Valve*	**Distance to protected vessel**	
	Minimum	Maximum
NPS 3" (DN 80) - NPS 8" (DN 200)	19.7 ft (6 m)	23.0 ft (7 m)
NPS 10" (DN 250)	23.0 ft (7 m)	26.3 ft (8 m)

type	NPS / DN	length L1 *		length L2 *		width W *		height H *		E *		flange-Ø Di *		weight		counter flanges
		[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[lbs]	[kg]	
QV II-3	80/3"	8.98	228	15.75	400	7.87	200	20.47	520	1.14	29	3.15	80	28.66	13	DIN 2632-DN 80
QV II-4	100/ 4"	11.10	282	15.75	400	8.66	220	21.81	554	1.38	35	3.94	100	39.68	18	DIN 2632-DN 100
QV II-5	125/ 5"	13.78	350	15.75	400	9.84	250	23.62	600	1.54	39	4.72	120	57.32	26	DIN 2632-DN 125
QV II-6	150/ 6"	16.54	420	15.75	400	11.26	286	25.67	652	1.69	43	5.71	145	77.16	35	DIN 2632-DN 150
QV II-8	200/ 8"	21.85	555	25.59	650	13.39	340	29.21	742	2.36	60	7.48	190	123.46	56	DIN 2632-DN 200
QV II-10	250/ 10"	24.02	610	31.50	800	15.55	395	33.70	856	1.93	49	9.45	240	286.60	130	DIN 2632-DN 250

* see drawing no 05-08-23 on page 21

Exact values depend on the application. Contact your REMBE®, INC. representative if you have questions.

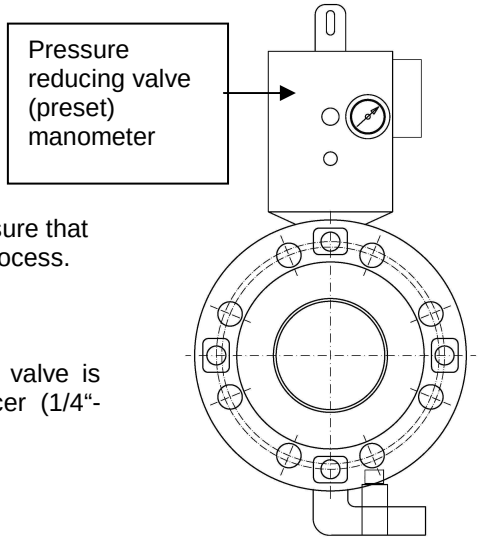
The counter flanges of the pipe shall be precisely identical to dimensions defined in DIN 2632 PN 10, with dimensions described above. In order to ensure proper functioning of the system, the installation must be frost-free (e.g. isolation and/ or heating measures must be taken). The compressed-air system of the plant can be used to supply air to the Quench Valve. The compressed air must be filtered, dry and free of oil residues.

The pressure of the air storage tank is limited by a pressure regulator at an operating pressure of maximum of 87 PSI (6.0 bar) The compressed-air connection is G 1/4" as standard. In order to ensure the operation of the valve in the event of compressed-air system failure, a check valve is integrated into the supply connection. The check valve is protected against unauthorized adjustment via lock and key located on the safety valve.

3.1.1 Installation Instructions for QV II Quench Valve

Preparation of installation place

The pipe work has to be fitted with counter flanges according to the Installation notes, section 3.1. (see page 7)



Mounting of the QV II Quench Valves

Be sure to allow the counter flanges to cool after welding. This is to ensure that the rubber Quench seal is not damaged by heat during the mounting process.

The electronic supply needs to be cut.

For better inspection, the gauge should be easily viewed once the valve is mounted. The air supply has to be counter to the pressure reducer (1/4"-connecting).

Mounting QV II-3 to QV II-10

The bolt flanges of the QV II Quench Valves have to be tightened to following specifications:

bolts	M 16	(80...100 Nm (710…885 in.lbf)
bolts	M 20	(80...120 Nm (710…1062 in.lbf)

The screws must be tightened cross over. Torque each bolt in sequence to 80 Nm and than 2 times again to 100 (M 16) [120 (M 20)] Nm. After the first operating cycles the torque has to be checked. A minimum of one check per year shall be made and this inspection must be documented.

The electrical wiring of the **QV II Quench Valve** can now be counter.

Note:

The compressed-air connection must be isolated mechanically from the plant system to prevent vibrations from being transmitted to the **QV II Quench Valve**. A flexible hose of 3.3ft (1m) is recommended.

When the operating pressure is reached, the entire system can be set to an "armed" status by the reset button at the EXKOP®MINI Safety Controller. (See section 4. EXKOP®MINI Safety Controller, page 10).

A pressure gauge at the tank allows for visual monitoring of available operating pressure.

The pressure regulator and pressure switch settings are set by **REMBE®** and may only be altered after consulting with the REMBE® service department. All warranty claims against REMBE® will become null and void in the event of unauthorized adjustment.

For systems operating under vacuum conditions, it is necessary to arm the EXKOP®MINI System before switching on the conveying system to prevent clogging or excessive wear of the QV II Quench Valve.

The pipe between the QVII Quench Valve and the protected enclosure must have a P_{red} of 14.5 PSI/1.0 bar or a P_{red} of the protected enclosure - contact your REMBE®, INC. Representative to confirm required pipe strength.

3.2 Maintenance notes

When conducting maintenance work, the compressed-air supply must **not be interrupted**.

Minor leaks at couplings will cause a loss of pressure in the tank. In the event that the supply of plant air to the pressure tank is interrupted, the tank will maintain a safe level of air pressure for a minimum of three hours.

If the supply pressure drops below 65 PSI (4.5 bar), the pressure switch signals a system error which is automatically evaluated by the **EXKOP®MINI Safety Controller**. This action results in an immediate activation of the **QV II Quench Valve** and a **shutdown of the production line**.

Below this supply pressure, you cannot be certain the **QV II Quench Valve** will be completely closed. Also, in the event of a power failure, the QV II Quench Valve will close immediately (fail-safe).

Note:
Before switching off the power, caution must be taken to ensure that the pinch area of the QV II Quench Valve is clear in order to avoid injuries to personnel!

3.3 Technical data of QV II Quench Valve

Compressed-air connection:	G1/4" at pressure reducer
Compressed-air supply:	Minimum 87.02 psi (6 bar)
Compressed-air monitoring:	Via pressure switch at tank, signal to **EXKOP®MINI Safety Controller**
Commissioning pressure:	80 psi (5.5 bar)
Minimum operating pressure:	72.5 psi (5.0 bar)
Voltage supply:	24 V DC via **EXKOP®MINI Safety Controller (max 100 W)**

4. EXKOP®MINI Safety Controller

4.1 Installation notes

The **EXKOP®MINI Safety Controller** is delivered completely wired, in a housing with a lockable door. The controller should be installed in a readily visible location within a dry, heated room.

Supply voltage variations (24 VDC) in the range of ±10 % are acceptable. Power consumption is approximately 100 W. In the case of higher voltage supply variations or extreme transient spikes, the use of a main filter and/or voltage stabilizer is recommended.

The connecting cables to the **KFD2-ST2-Ex1.LB** transformer isolated barrier are monitored for open-circuit and short-circuit. These faults are indicated by means of the LED's display and cause an immediate closing of QV II Quench Valve.

For trouble-free operation, we recommend the use of shielded cables at the inputs of the **EXKOP®MINI Safety Controller**, since disturbing pulses can be produced in industrial plants through the use of high-current or high-voltage cables and high inductance or capacitance.

The maximum cable length between the **EXKOP® Safety Controller** and individual control components (**QV Quench Valve, explosion panel, Q-Rohr®-3, Q-Box II, etc.** must not exceed 1968.5 ft (600 m).

NEC, VDE 100 or other applicable regulations must be observed.

Note:
If spark detectors are used in this application, the EXKOP®MINI controller is equipped with an AGF 1012 transformer. Please wire according to the schematic on page 24.
The required minimum and allowed maximum distances of the spark detectors to the QVII depend on the application and are to be approved by your REMBE® INC., representative.

4.2 Description of function

The **EXKOP®MINI Safety Controller** consists of a central processing unit (CPU), which monitors both the signals of the **KFD-ST2-Ex1.LB** transformer isolated barrier and the pressure switches on the QV Quench Valves. The CPU is fail-safe programmed and monitors the signaling cables for lead breakage and short circuit.

4.2.1 Input modules

The **KFD-ST2-Ex1.LB** transformer isolated barrier is used for signaling the status of the counter explosion panels, **REMBE® Q-Rohr®**-3 or **Q-Box II**. Upon activation of the Q-Rohr® or other safety device, a signal is immediately sent to the **EXKOP®MINI Safety Controller**. The signal is subsequently evaluated and the **QV II Quench Valve** will be closed immediately.

The pressure switch, located at the compressed-air tank of the **QV II Quench Valve,** monitors the operating pressure. If the pressure should fall below the minimum operating value, closure of the **QV II Quench Valve** is initiated for safety reasons.

In addition, other signals can be sent to the **EXKOP®MINI Safety Controller**:

- Infrared spark detectors and/or pressure sensors for plant monitoring purposes.
- Signals from programmable controllers and/or central monitoring systems of plant controls.
- Fire detection or fire extinguishing systems

4.2.2 Output modules

The output modules are for the activation of the QV II Quench Valves and the relay contacts.

These modules supply the solenoid valve at the QV II Quench Valve with power. Any and all signals which could be interpreted as failures will lead to an immediate activation of the output modules (fail safe).

The **relay contacts (K)**, are designed for audible and visual signaling of the alarm status (audible and flashing light). The connection of additional alarm indicators can also take place via relay contacts. This enables a safe and controlled plant shutdown procedure in the event of an alarm.

4.2.3 Internal data storage

A change of operating condition, faults and failures of the supply voltage are stored internally in the **EXKOP®MINI Safety Controller** in chronological order.

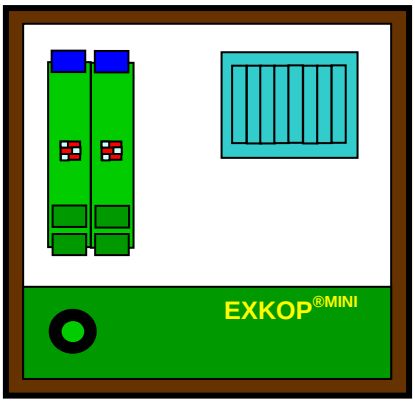
The storage capacity is sufficient for storing events over a period of one year. Storage takes place by means of ring storage so that the oldest data is overwritten when the storage unit is full.

The “TEST” function, to be carried out regularly (see section 6, Functional Test, page 15), is stored in the storage unit. This ensures continuous recognition of all operating sequences.

The data can be shown on a PC or as a print-out (PC and printer are not included in the scope of supply of the EXKOP®MINI Safety Controller).

In the event of an explosion, the operating sequences prior to the event can be precisely reconstructed.

4.3 EXKOP®MINI Safety Controller - function



The **EXKOP®MINI Safety Controller** is operated by one button. Start or arm the **EXKOP®MINI Safety Controller** by pressing the RESET/TEST button.

Different functions of the **EXKOP®MINI Safety Controller** can be adjusted by different jumper settings. These different functions are described below and in the attached drawings.

Chart of different functions

Input terminal	14 X1.16	15 X1.17	16 X1.18	EXKOP®MINI Function
	0	0	0	2 - 2
	0	0	1	2x (1 - 1)
	0	1	0	2 - 1
	0	1	1	1 - 2
	1	0	0	1 - 1
	1	0	1	2 - 2 *)
	1	1	0	2 - 2 *)
	1	1	1	2 - 2 *)
terminal	X4.16	X4.17	X4.18	+24VDC
	0 = no jumper 1 = jumper			

Function 2 – 2: Both signal inputs cause closing of both QV II Quench Valves; that means any activation signal will close both QV II Quench Valves.

Function 2x (1 – 1): Two separate lines with one QV II Quench valve each. By activation of bursting disc #1, QV II Quench Valve #1 will be closed. By activation of bursting disc #2, QV II Quench Valve #2 will be closed.

Function 2 – 1: By activation of bursting discs #1 and #2, the counter QV II Quench Valve # 1 will be closed.

Function 1 – 2: By activation of bursting disc #1, both counter QV II Quench Valves will be closed.

Function 1 – 1: By activation of bursting disc #1, the counter QV II Quench Valve #1 will be closed

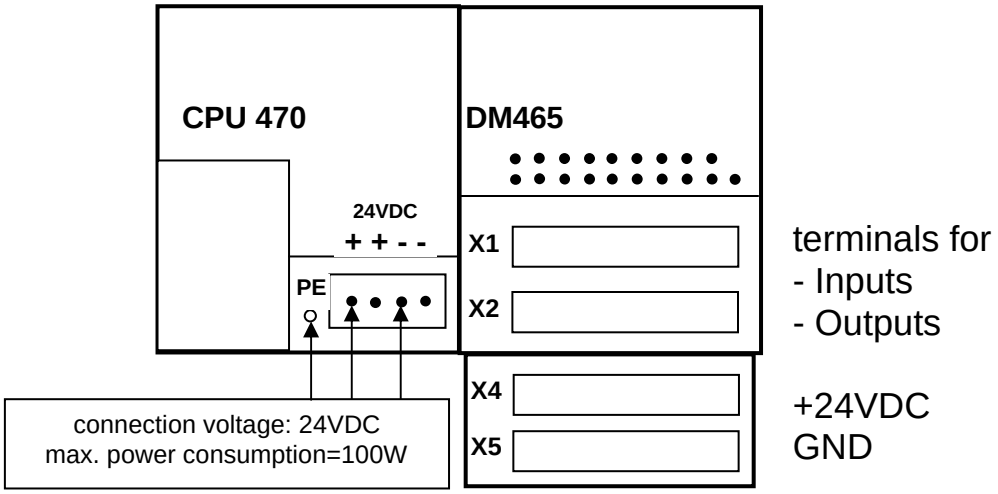
Function 2 – 2*): If no Function is adjusted by a jumper setting, function 2 – 2 will be automatically activated!

By activation of QV II Quench Valve #1, the K1 alarm relay will be activated. By activation of the QV II Quench Valve #2, the K2 alarm relay will be activated. The K3 alarm relay is a summary relay and will be activated for any event. Unused inputs must be jumped in order to display “safe” status.

4.3.1 EXKOP®MINI Safety Controller – operation and wiring

The EXKOP® Safety Controller controls the counter input and output modules automatically. Programming is necessary only during the initiation and test run.

The power supply of the EXKOP®MINI Safety Controller must be counter to a 4-pole terminal of the CPU-Modules at the clamp + and – with 24V direct voltage.



Function of LED's on the CPU-Module DM 465

The **yellow LED U** indicates the power supply of in and outputs. Below a power supply of approx. 18VDC the LED turns dark.

Note: The DM 465 control modules have 16 Inputs with green LED's and 16 Outputs with yellow LED's. But it will only show 8 Inputs/Outputs at the same time. Press the little white Key at the modules to toggle between:

Yellow LED S#…	In-/Output **1 – 8**
Yellow LED S#+1…	In-/Output **9 – 16**

The **input** status will be shown through **green LED's** as follows:

Input #1	Bursting disc #1	Save status	= LED on
Input #2	Pressure air QV II #1	Save status	= LED on
Input #3	Bursting disc #2	Save status	= LED on
Input #4	Pressure air QV II #2	Save status	= LED on
Input #5	Reset key	pressed	= LED on
Input #14	Bypass C	Jumper installed	= LED on
Input #15	Bypass B	Jumper installed	= LED on
Input #16	Bypass A	Jumper installed	= LED on

The **output** status will be shown through **yellow LED's** as follows:

Output #1	Control Valve QV#1	Active = LED on
Output #2	Control Valve QV#1	Active = LED on
Output #3	Air Valve QV#1	Active = LED on
Output #4	Air Valve QV#1	Active = LED on
Output #5	alarm-relay #1	Save status = LED on
Output #6	Control Valve QV#2	Active = LED on
Output #7	Control Valve QV#2	Active = LED on
Output #8	Air Valve QV#2	Active = LED on
Output #9	Air Valve QV#2	Active = LED on
Output #10	alarm-relay #2	Save status = LED on
Output #11	summary alarm-relay	Save status = LED on

Unlisted Inputs/Outputs are not used.

Terminal 1 and 2 for the connection of the power supply voltage of inputs and outputs are at the junction block X1 and X2:

Terminal#1:	GND
Terminal#2:	+24VDC

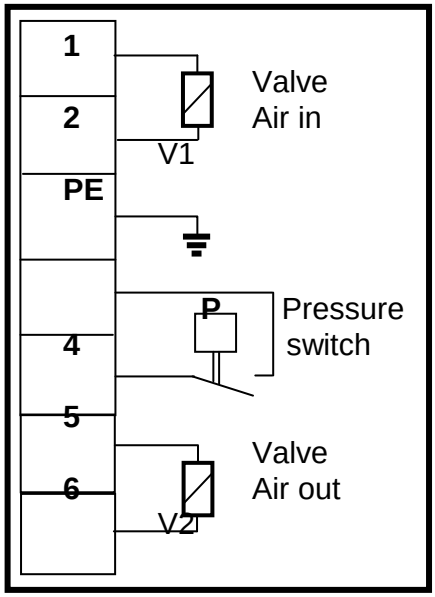
4.3.2. Output modules QV II Quench Valve - wiring

In case of alarm or any failure, the **QV II Quench Valve** output modules are activated by the CPU and the pipe is isolated by the closing of the **QV II Quench Valve**.

During normal mode, the QV II Quench Valve solenoid valve is powered by the **EXKOP®MINI Safety Controller.** The pressure switch is monitored by the CPU.

The terminals in the EXKOP®MINI Safety Controller's CPU will be counter to the terminals of the QV II Quench Valve according to the wiring diagram on right.→

Recommended cable:
Shielded cable with cross section of 1 mm^2 (0.00155 in^2)



4.3.3 EXKOP®MINI Safety Controller – initialization

After switching on the power, the EXKOP®MINI Safety Controller conducts a self test. All internal and external signals will be checked. If the **KFD2-ST2-Ex2.LB-Electronic** LED display lights are “green” and pressure inside the tank of the **QV II Quench Valve** is built up, the **EXKOP®MINI Safety Controller** will be armed by pressing the **Reset** button.

The **EXKOP®MINI Safety Controller** is now armed.

5. Functional check

The EXKOP®MINI System has to be checked monthly by using the test button.

Before carrying out a system check, the plant safety representative must ensure that no danger will occur during this procedure.

The test function simulates an activation of the **EXKOP®MINI Safety Controller.**

Press the **Reset** button for 5 seconds. This will cause all Quench Valves counter to the controller to be closed immediately. The tests have to be documented in the operating diary. Also all counter systems, such as process plant computers, fire alarms or other safety devices, will be activated.

The following message will be shown for each counter Quench Valve separately: “Failure air QV X“ by LED’s.” This status will not change until the air supply in each air tank reaches required pressure.

After all pressure air tanks are filled, the EXKOP®MINI Safety Controller can be armed by the RESET key again.

The system check must be documented in the log book.

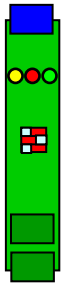
6. KFD2-ST2-Ex1.LB Transformer isolated barrier

Monitoring of **Q-Rohr®-3, Q-Box II, triple section explosion panels** or other indicators (besides spark detectors) is carried out by the **KFD2-ST2-Ex1.LB electronic** transformer isolated barrier.

Three integrated LED's serve for status indication:

Green LED lights:	Power supply is counter to the relay = no fault
Yellow LED lights:	Output signal = sensor ok = save status
Yellow LED dark:	Sensor or bursting disc not ok = alarm status
Red LED flashing:	Broken cable to sensor = failure = alarm status

The **KFD2-ST2-Ex1.LB electronic** is supplied via the **EXKOP®MINI Safety Controller**. The signal cables are monitored for lead breakage and short-circuit.



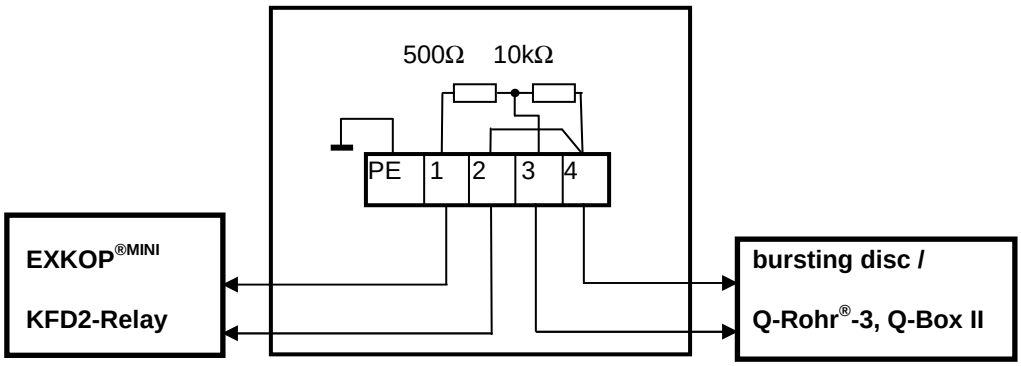
The no-fault-status of the signaling unit is indicated by the **Yellow LED**. This also ensures that explosion panels, **Q-Rohr®-3**, **Q-Box II** or other protective units are reliably monitored for their operating condition in a central location. Upon activation of the signaling unit, an alarm is generated (**Yellow LED** dark).

The **EXKOP®MINI Safety Controller** detects this condition and immediately activates the **QV II Quench Valve** as well as the alarm. The **EXKOP®MINI Safety Controller** can only be armed when the signaling unit has no fault status: **Yellow LED** light is on.

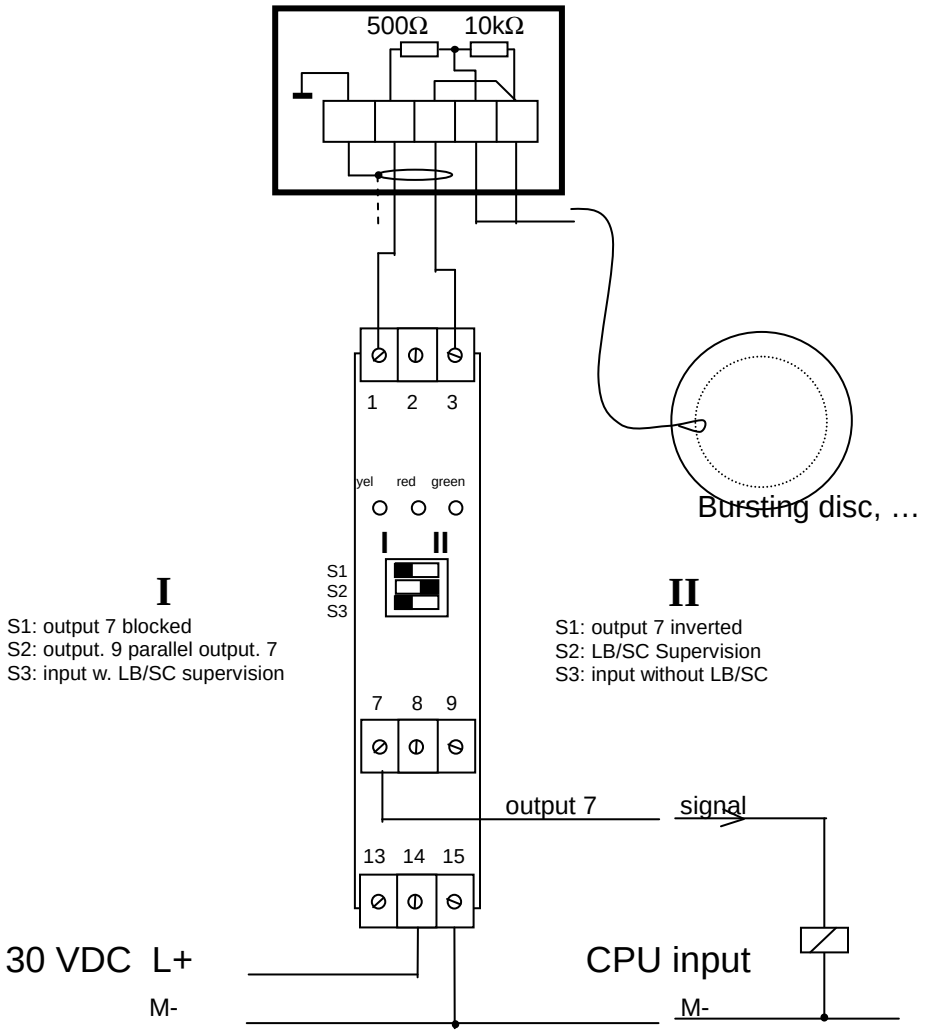
The connection of power supply voltage of the input modules is already wired.

The signaling unit of the bursting disc, **Q-Rohr®-3, Q-Box II** or other signaling units (blue cable) has to be counter to the junction box as follows:

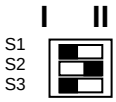
Junction box near the bursting disc and/or the Q-Rohr®-3



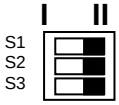
The input of the **KFD2-ST2-Ex1.LB electronic** has to be counter to the terminals #1 and #2 in the junction box and in the **EXKOP®MINI Safety Controller** at the terminals according to the terminal diagram. The signaling unit of explosion panels, **Q-Rohr®-3,** or **Q-Box II** has to be counter to the terminals #3 and #4 in the junction box.



Position of switches as standard:



In case the module is not in use the switches have to be in the following position:



Note:

If spark detectors are used in this application, the EXKOP®MINI controller is equipped with an AGF 1012 transformer instead of the 2 KFD2-ST2-Ex1.LB. Please wire according to the schematic on page 24.

7. Technical data

EXKOP®MINI Safety Controller
Electronic control module for high speed monitoring of explosion events and activation of QVII Quench Valves. Self monitoring Safety Controller with internal data storage. Status report via display.

Supply:	24 VDC
Power consumption:	approx. 100 W
Basis Version	
Signal input:	2 KFD2-ST2-Ex1.LB Input modules monitoring the signal cables for open and short circuit. (AGF 1012 transformer will also be used for spark detector applications and monitors the cable for open and short circuit as well)
Signal output:	2 QV II Quench Valve floating switch contact 230V, 5A for line #1, line #2, collective failure visual and audible alert
Memory:	ring memory
Housing:	Polycarbonate housing with lockable door
Dimensions:	9.21”x10.39”x5.55”(234 x 264 x 141 mm) (WxHxD)
Degree of protection:	IP 54
Weight:	approx. 22.05 lbs.(10 kg)

EXKOP®MINI Safety Controller

Explosion Isolation System
Log Book
Facility no: _____

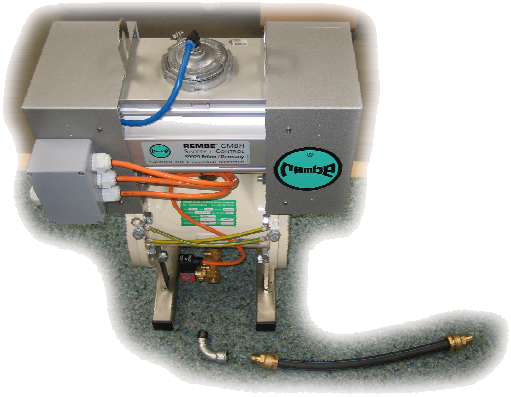
From____/_____/_____ To_____/_____/_____

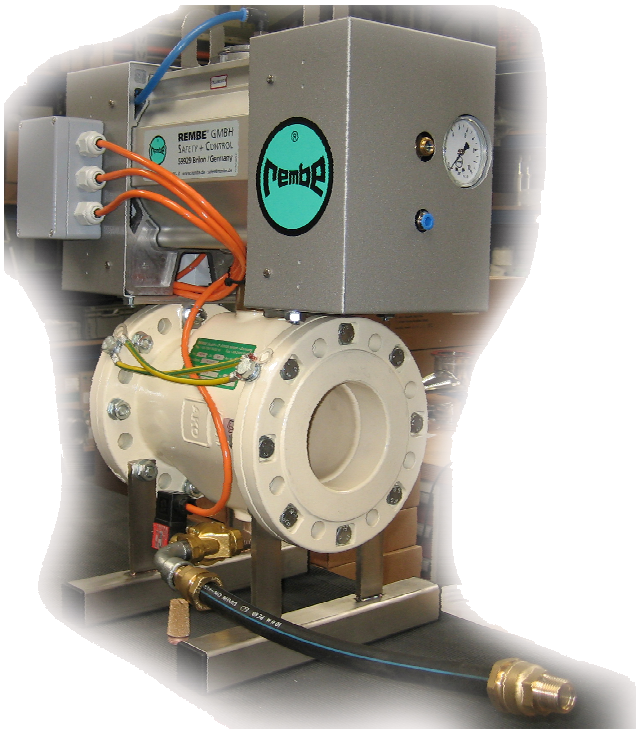
file no.	date	time	event	name	signature

Annex

Vacuum conditions for QV Quench Valve

If you expect vacuum conditions in the process, a bypass to the QV Quench valve must be installed. The bypass eliminates differential pressure between the process and the interior of the Quench seal. This bypass assures full bore opening of the Quench Valve.

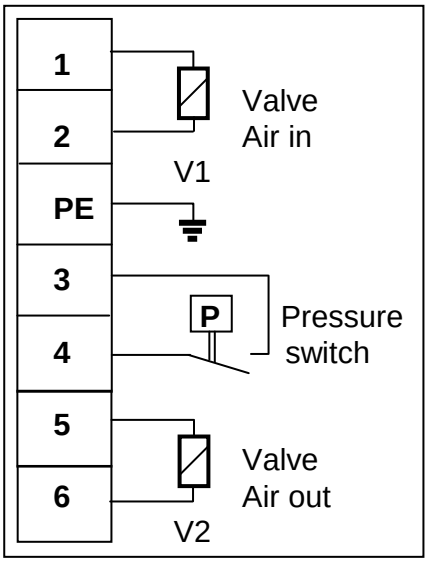


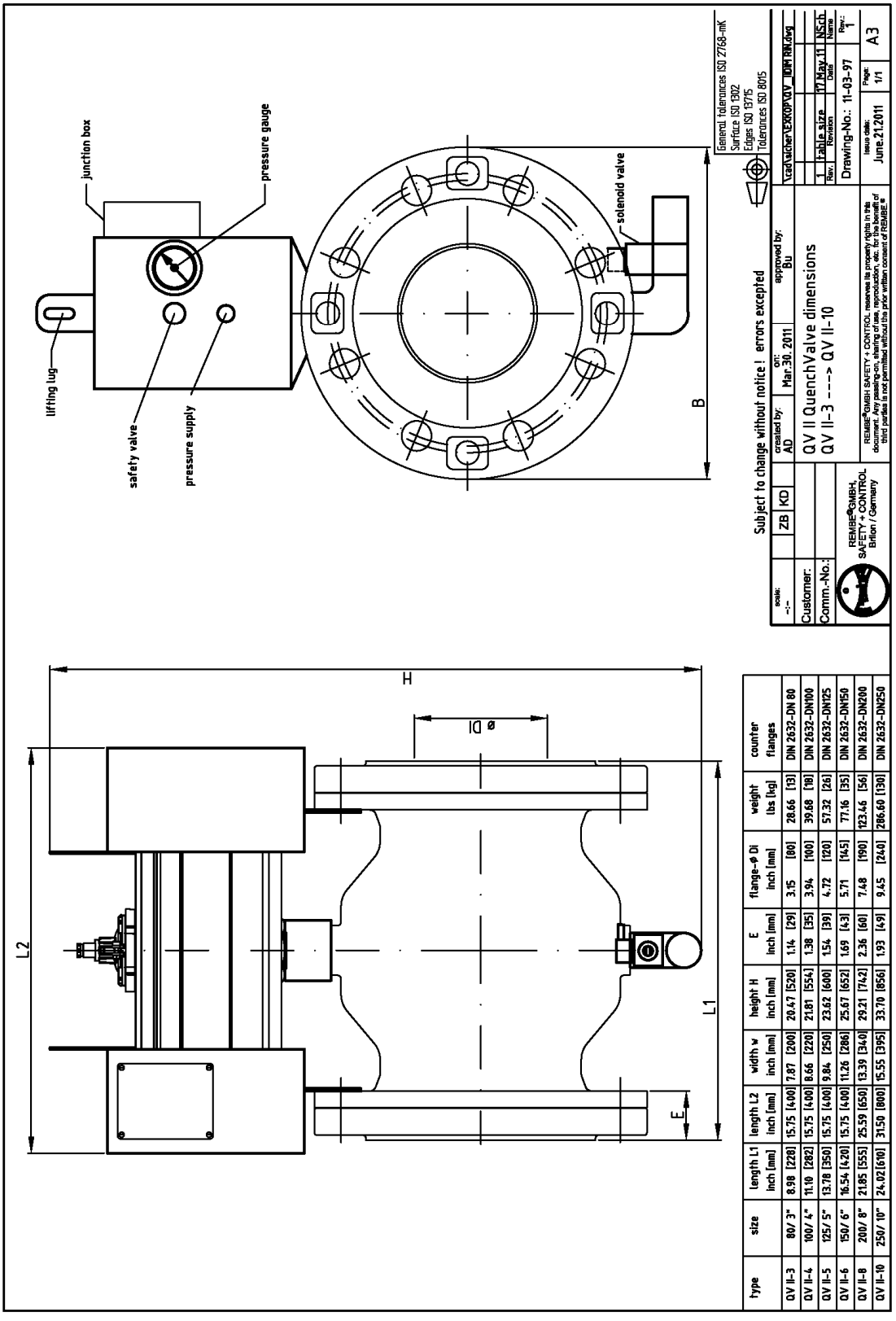


Without electrical power, the QV-Valve is closed by pressurized air from the plant network. To open the QV Quench Valve, the air valve must be energized. The QV releases the pressurized air through the bypass. Only one ½ inch pipe must be conducted to the **clean air side** (vacuum side) of the filter. The bypass pipeline must withstand the expected vacuum and shall not collapse due to the vacuum. The vacuum equalization ensures a full bore opening.

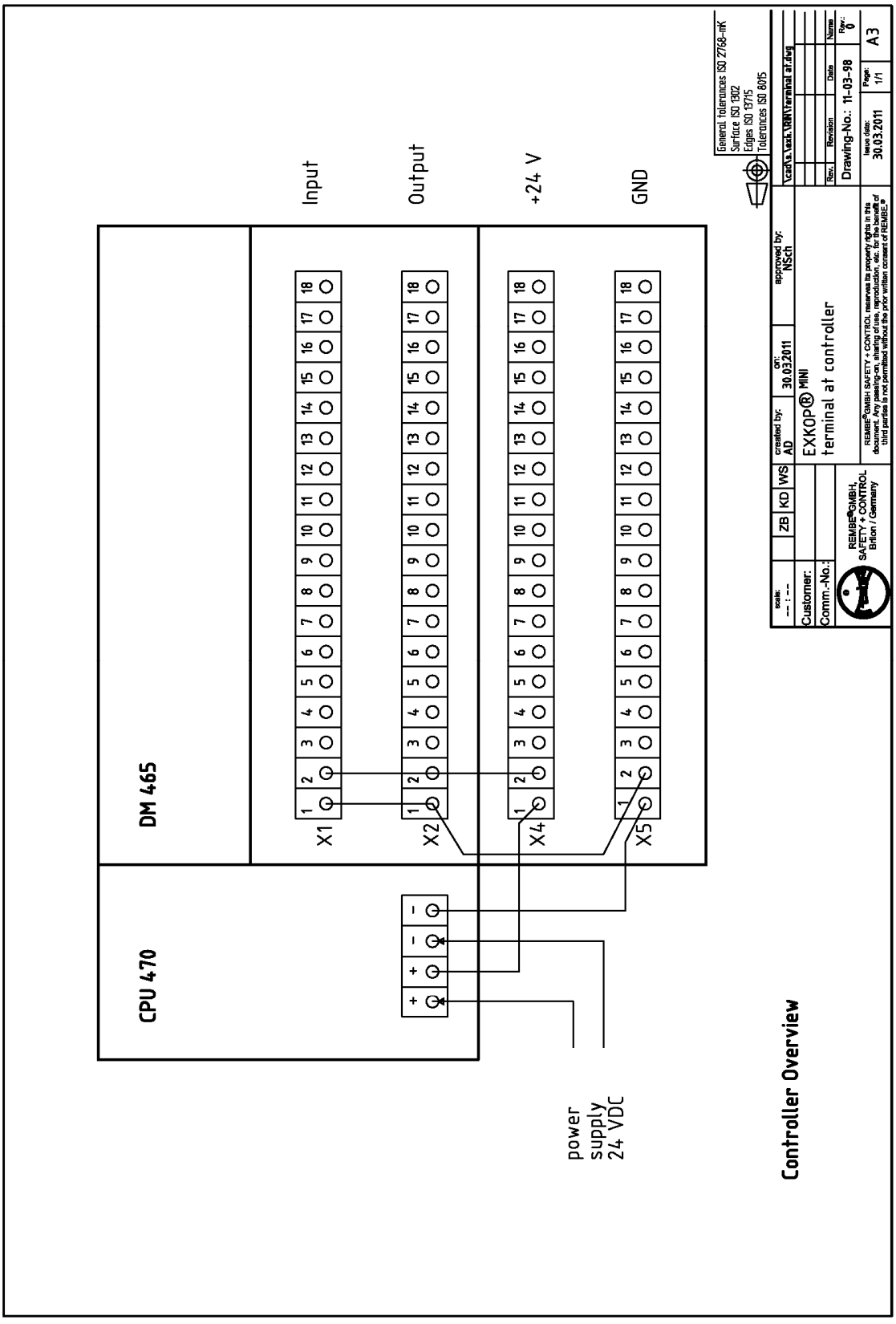
The Quench Valve must be grounded to the counter flanges.

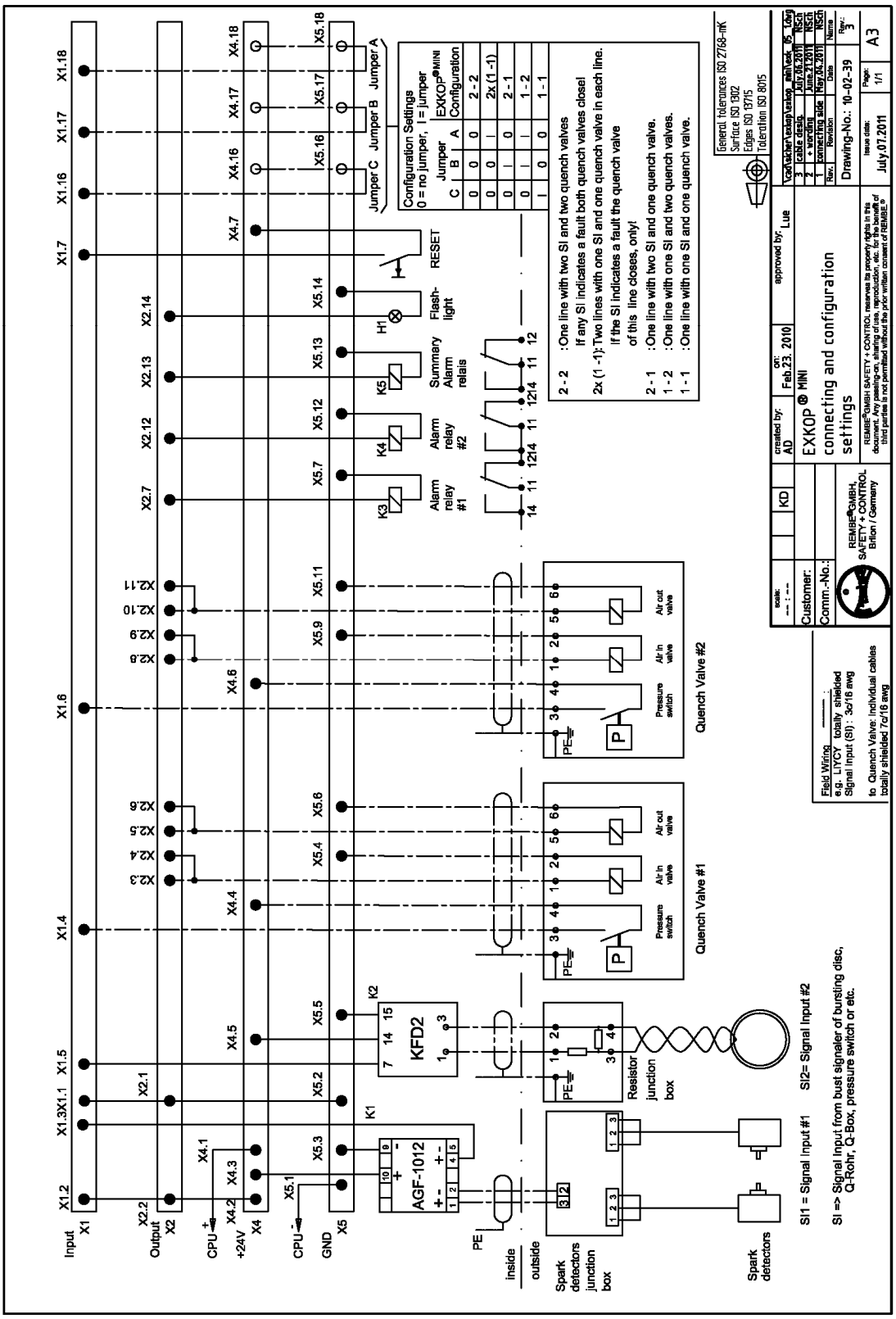
Before starting the product flow, the QV II Quench Valve must be armed through the **EXKOP®MINI** safety controller. Otherwise the Quench Valve will not ensure the full bore opening and extensive abrasion will occur on the rubber seal. **This will shorten the lifetime of the Quench Valve unit.**

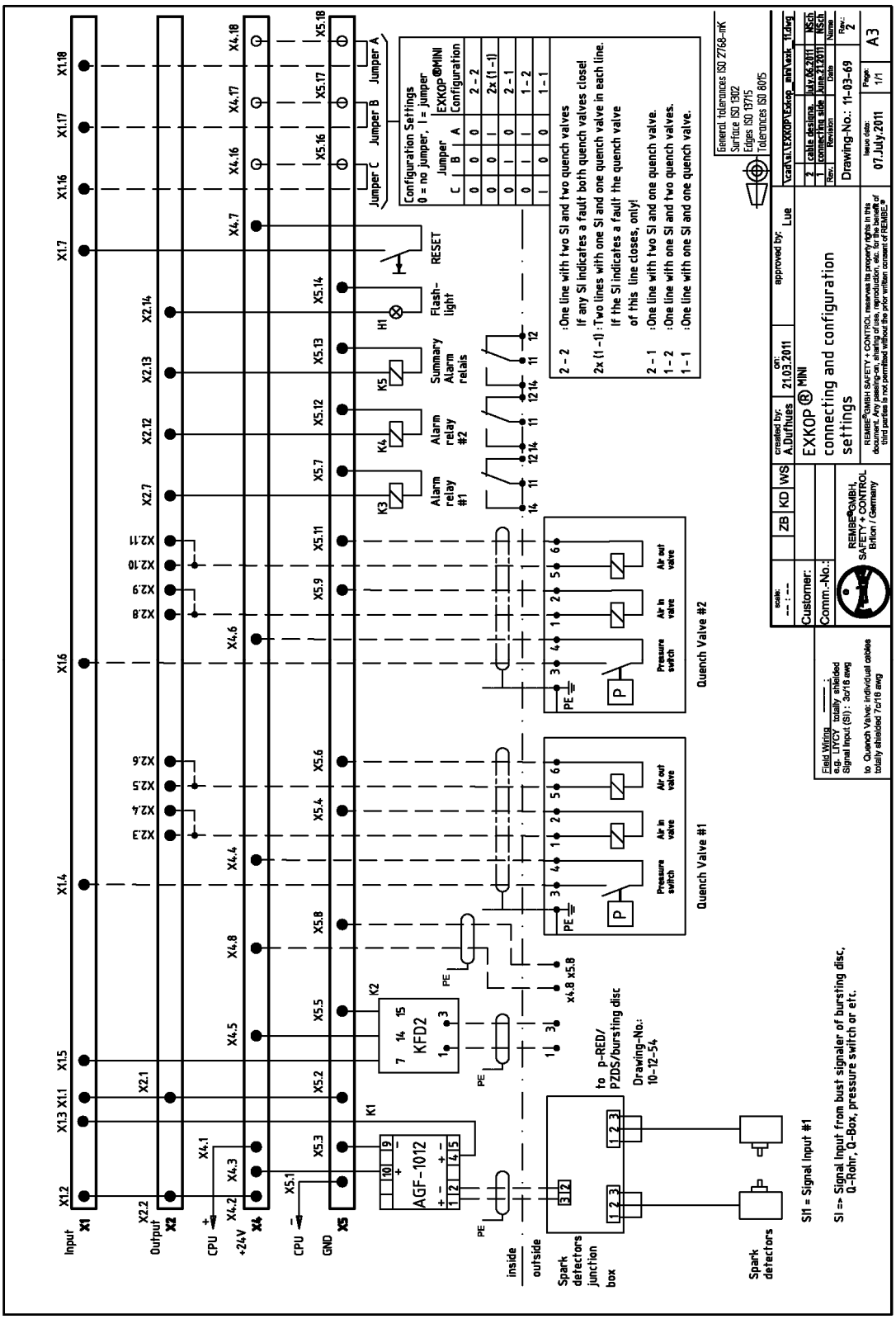


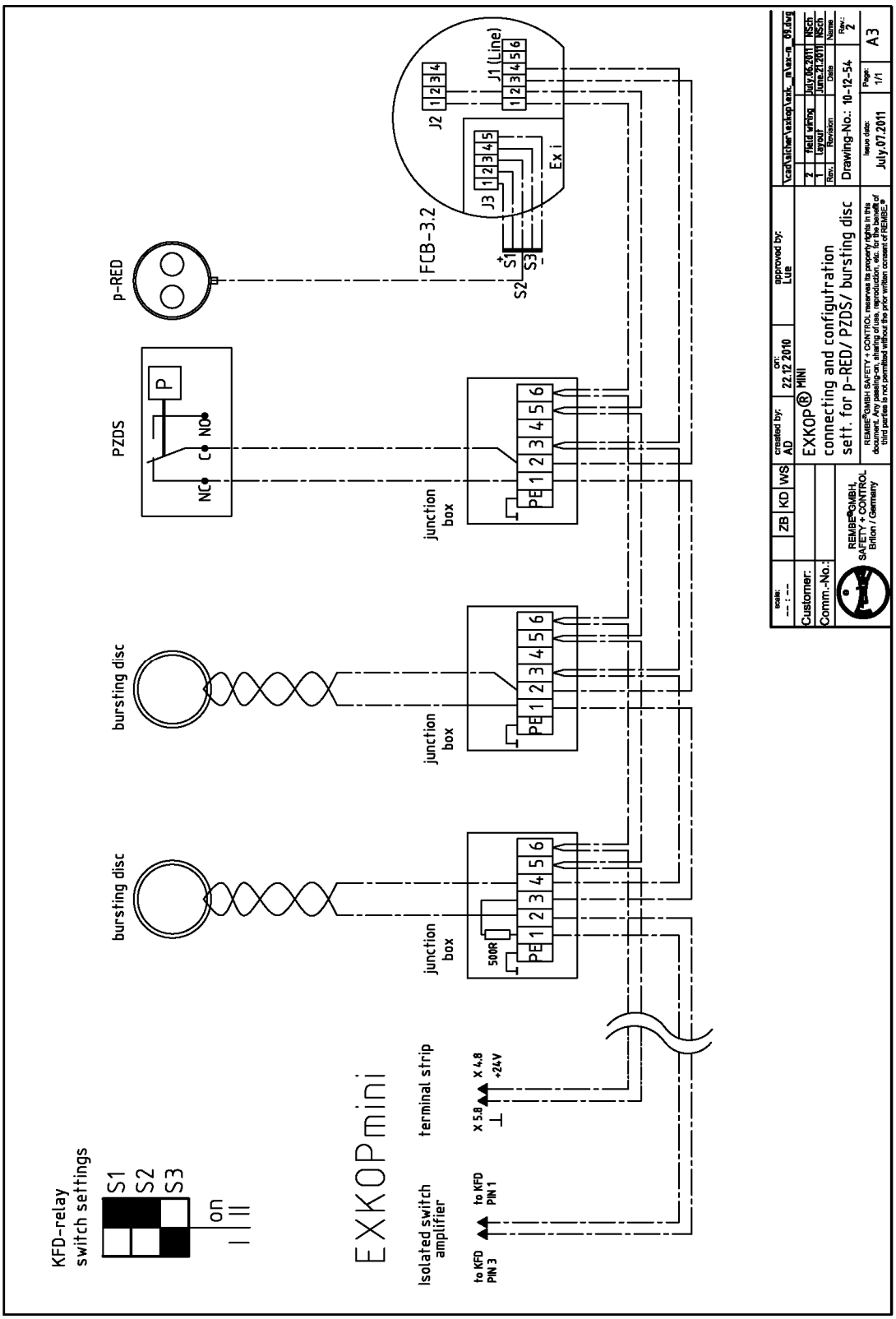


type	size	length L1 inch [mm]	length L2 inch [mm]	width w inch [mm]	height H inch [mm]	E inch [mm]	flange-ø Di inch [mm]	weight lbs [kg]	counter flanges
QV II-3	80/ 3"	8.98 [228]	15.75 [400]	7.87 [200]	20.47 [520]	1.14 [29]	3.15 [80]	28.66 [13]	DIN 2632-DN 80
QV II-4	100/ 4"	11.10 [282]	15.75 [400]	8.66 [220]	21.81 [554]	1.38 [35]	3.94 [100]	39.68 [18]	DIN 2632-DN100
QV II-5	125/ 5"	13.78 [350]	15.75 [400]	9.84 [250]	23.62 [600]	1.54 [39]	4.72 [120]	57.32 [26]	DIN 2632-DN125
QV II-6	150/ 6"	16.54 [420]	15.75 [400]	11.26 [286]	25.67 [652]	1.69 [43]	5.71 [145]	77.16 [35]	DIN 2632-DN150
QV II-8	200/ 8"	21.85 [555]	25.59 [650]	13.39 [340]	29.21 [742]	2.36 [60]	7.48 [190]	123.46 [56]	DIN 2632-DN200
QV II-10	250/ 10"	24.02 [610]	31.50 [800]	15.55 [395]	33.70 [856]	1.93 [49]	9.45 [240]	286.60 [130]	DIN 2632-DN250


DM 465
CPU 470
Input
Output
+24 V
GND
X1
X2
X4
X5
power supply 24 VDC
Controller Overview
EXKOP® MINI
terminal at controller
REMBE® GMBH, SAFETY + CONTROL
Brilon / Germany
30.03.2011
11-03-98


Input X1
Output X2
CPU+ X4
+24V X4
CPU- X5
GND X5
PE
inside
outside
AGF-1012
KFD2
K1
K2
Resistor junction box
Spark detectors junction box
Spark detectors
Quench Valve #1
Quench Valve #2
Pressure switch
Air in valve
Air out valve
Alarm relay #1
Alarm relay #2
Summary Alarm relais
Flash-light
RESET
Jumper A
Jumper B
Jumper C
Configuration Settings
0 = no jumper, I = jumper
EXKOP® MINI Configuration
2 - 2
2x (1 -1)
2 - 1
1 - 2
1 - 1
2 - 2 : One line with two SI and two quench valves
If any SI indicates a fault both quench valves closes!
2x (1 -1): Two lines with one SI and one quench valve in each line.
If the SI indicates a fault the quench valve
of this line closes, only!
2 - 1 : One line with two SI and one quench valve.
1 - 2 : One line with one SI and two quench valves.
1 - 1 : One line with one SI and one quench valve.
SI1 = Signal Input #1
SI2= Signal Input #2
SI => Signal Input from bust signaler of bursting disc, Q-Rohr, Q-Box, pressure switch or etc.
Field Wiring
e.g. LiYCY totally shielded
Signal input (SI) : 3x/16 awg
to Quench Valve: individual cables totally shielded 7x/16 awg
REMBE® GmbH SAFETY + CONTROL
Brilon / Germany
created by: AD
on: Feb.23. 2010
approved by: Lue
EXKOP® MINI
connecting and configuration settings
Customer:
Comm.-No.:
Drawing-No.: 10-02-39
Issue date: July.07.2011
Page: 1/1
A3
General Tolerances ISO 2768-mK
Surface ISO 1302
Edges ISO 13715
Toleration ISO 8015


Input X1
Output X2
CPU +
+24V X4
CPU −
GND X5
AGF-1012
KFD2
K1
K2
K3
K4
K5
Alarm relay #1
Alarm relay #2
Summary Alarm relais
Flash-light
RESET
H1
Configuration Settings
0 = no Jumper, 1 = Jumper
Jumper C Jumper B Jumper A
EXKOP®MINI Configuration
2 - 2
2x (1 -1)
2 - 1
1 - 2
1 - 1
2 - 2 :One line with two SI and two quench valves
If any SI indicates a fault both quench valves close!
2x (1 -1) : Two lines with one SI and one quench valve in each line.
If the SI indicates a fault the quench valve of this line closes, only!
2 - 1 :One line with two SI and one quench valve.
1 - 2 :One line with one SI and two quench valves.
1 - 1 :One line with one SI and one quench valve.
Quench Valve #1
Quench Valve #2
Pressure switch
Air in valve
Air out valve
Spark detectors junction box
Spark detectors
inside
outside
to p-RED/ PZDS/bursting disc
Drawing-No: 10-12-54
SI1 = Signal Input #1
SI = Signal Input from bust signaler of bursting disc, Q-Rohr, Q-Box, pressure switch or etc.
Field Wiring e.g. EXKOP totally shielded Signal Input (SI): 3x/16 awg
to Quench Valve: individual cables totally shielded 7x/18 awg
created by: A.Duthues
on: 21.03.2011
approved by: Lue
EXKOP ® MINI
connecting and configuration settings
Customer:
Comm.-No.:
REMBE®GMBH SAFETY + CONTROL Brilon / Germany
Drawing-No.: 11-03-69
Rev.: 2
Page: 1/1
A3
07.July.2011
General tolerances ISO 2768-mK
Surface ISO 1302
Edges ISO 13715
Tolerances ISO 8015


KFD-relay
switch settings
S1
S2
S3
on
EXKOPmini
Isolated switch amplifier
terminal strip
to KFD PIN 3
to KFD PIN 1
X 5.8
X 4.8
+24V
junction box
500R
bursting disc
bursting disc
junction box
junction box
PZDS
NC
C
NO
P
p-RED
FCB-3.2
S1
S2
S3
J3
J2
J1 (Line)
Ex i
created by: AD
07: 22.12.2010
approved by: Lutz
EXKOP® MINI
connecting and configutration
sett. for p-RED/ PZDS/ bursting disc
Customer:
Comm.-No.:
Drawing-No.: 10-12-54
Rev.: 2
Page: 1/1
A3
issue date: July.07.2011
REMBE® GMBH, SAFETY + CONTROL Brilon / Germany